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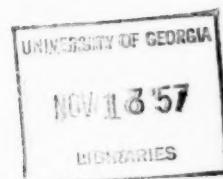
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A STUDY IN CULTURALIZATION OF RESPONSE

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Sherif's initial study of "social norm" behaviors (1935, 1936) using the autokinetic movement has been a useful laboratory illustration bearing upon the culturalization of stimulus-response functions. His experimental technique appears to be an appropriate one for showing some of the conditions in which the sharing of responses evolves. Using a similar setting, Schenbar (1945) showed that convergence in distance judgments also occurs with the stimulus light in actual movement. Bevard (1948) showed that the group setting influences toward convergence operates with large individual differences upon the subjects of the group. Asch (1952) and Crutchfield (1955) using quite different stimuli and response measures have indicated both situational and behavior history variables which influence the individual's responses in settings that may be viewed as culturalization loci. This trend of studies offers promising leads for the study of perceptual reaction systems as functions of the total interactional setting. Further studies in the analysis of the variables involved in shared response development are warranted.

The use of laboratory tasks which require responses on a quantitative continuum have, perhaps, a special usefulness in studying the development of shared responses. This is not to suggest that quantitative continua are the only method by which culturalization of responses can be shown. However, when subjects are presented with novel stimulus situations and asked to make quantitative judgments for which they have no appropriate experiential history, pertinent observations may be made on the relative uniqueness and sharedness of responses.

An unpublished exploratory study by Herman, Bowles and Hill (1943) made use of such a situation. Subjects were used in both individual and group settings similar to those of Sherif. The stimuli were the repeated rollings of a wooden croquet ball in a grooved trough. Subjects were screened from the apparatus so that they could not see the ball rolling, but could easily hear it. They were instructed to estimate the distance that the ball rolled each time. Subjects responded under INDIVIDUAL conditions, that is, without knowledge of any other subject's responses, and under GROUP conditions, in sets of three subjects with each subject knowing each of the other two subject's responses for each stimulation. Sets of three randomly selected INDIVIDUAL conditions subjects were compared with three GROUP conditions subjects in the range or difference between the subject making the longest judgments and the subject making the shortest judgments of each set of three subjects. Added to this procedure was the variable of information regarding the stimulus situation given in the instructions to the subjects. Four information conditions, each giving more factual information regarding the nature of the stimulation, were used. Similarly with the findings of Sherif, it was found that subjects judging initially under GROUP conditions showed a narrower range of difference in their responses than did three subjects responding under INDIVIDUAL conditions. Subjects who judged initially under the INDIVIDUAL conditions

ions and then judged under GROUP conditions were found to converge in their judgments under the GROUP conditions. The data suggested, however, that the relative amount of convergence in judgments tended to be less as the amount of factual information given in the instructions increased. It was tentatively concluded that the evolving of shared responses, for some situations, is an inverse function of how much the subject knows of the factors of the stimulus situation.

Under grants from the Social Science Research Council and the University of Wichita, Herman and Staner (1954) repeated portions of the above study using larger samples and improved controls of the experimental situation. Ball rolling stimulations were recorded on tape. These were 45 stimulations of randomly mixed distances of 16, 43 and 67 inches. Separate rooms with a communication system between the rooms were used. Subjects were instructed that a ball would be rolled a number of times; they would hear it rolling through the loud speaker; each subject was to make his best judgment of the distance the ball rolled each time. No information was given regarding the size of the ball or any other aspect of the apparatus. A total of 144 subjects divided into 48 sets of three subjects each was used. Subjects were run under the following conditions: INDIVIDUAL-GROUP, INDIVIDUAL-INDIVIDUAL, GROUP-INDIVIDUAL, GROUP-GROUP. When responding under the INDIVIDUAL conditions each subject wrote his responses without contact with other subjects' responses. When responding under the GROUP conditions each subject spoke his response aloud in the presence of the other two subjects of the set. Half of the sets of subjects were run with a 5 minute interval of reading unrelated materials between the initial and the final conditions. The other half of the sets of subjects were run with instructions, at the time of the interval, to discuss their responses in any way they wished. These discussions were tape recorded without knowledge by the subjects.

The findings of this study are to be reported in detail in one of the journals shortly. A brief description of the findings and implications will be reported here.

It is relevant to indicate that no reliable differences in length of distance judgments were made by subjects run under the INDIVIDUAL and under the GROUP conditions. Nor was any consistent trend found for greater accuracy under either condition. For both conditions, however, subjects responded to longer durations of the rolling noise with larger distance responses.

As to judgment responses made relative to the setting conditions, the 24 sets of subjects who responded initially under INDIVIDUAL conditions showed, on the average, wide range within the set of three subjects. The 24 sets of subjects who responded initially under GROUP conditions showed a significantly (less than 1% level) narrower range within the sets of subjects. It appears that given this stimulus situation, subjects who respond initially under INDIVIDUAL conditions evolve perceptual frames of reference and respond, rather consistently, within them. Thus the same duration of rolling noise might be responded to with 2, 20 and 80 inches by the three subjects under INDIVIDUAL conditions. When subjects responded initially under GROUP conditions, however, their perceptual frames of reference are clearly more similar for the three subjects of the set, although not necessarily more accu-

rate. It would appear that the GROUP conditions for these interactions constitute a locus of culturalization of stimulus-response functions.

When subjects were run initially under INDIVIDUAL conditions, and, after a 5 minute interval of unrelated reading, were run under GROUP conditions, marked narrowing of the range of responses was found for the sets of subjects. It would appear that the availability of the responses of others results in the shift of the perceptual frame of reference of the subject in the direction of a common perceptual frame of reference. The range of responses for the sets of subjects under these final GROUP conditions, after responding under the INDIVIDUAL conditions, was, however, greater than for subjects responding under GROUP conditions initially. The influence toward communality of response, while clearly present, shows the influence of the preceding frames of reference established by each subject under the INDIVIDUAL conditions. Control sets of subjects, run under the INDIVIDUAL-INDIVIDUAL sequence, show no decrease in the range of responses under the final INDIVIDUAL conditions.

Subjects who were run in the GROUP-INDIVIDUAL sequence made, as was noted above, closely similar responses under the initial GROUP conditions. For the final INDIVIDUAL conditions some divergence of responses was found. The range under the final INDIVIDUAL conditions was clearly less, after subjects had made initial GROUP conditions responses, than it was in the final INDIVIDUAL responses of the INDIVIDUAL-INDIVIDUAL sequence. Control sets of subjects run in the GROUP-GROUP sequence showed a slight divergence under the final GROUP conditions, but not as great a divergence as under the final conditions of the GROUP-INDIVIDUAL sequence.

Sets of subjects parallel to those reported above were run, introducing the variable of instructions to converse in any way wished about the task and responses during the 5 minute interval between the initial and final conditions. Typescripts were made of this verbal interaction and submitted to some analysis. We will report here the data on final conditions responses as a function of the discussion interval variable.

Under the INDIVIDUAL-GROUP sequence, with discussion intervening, a significant convergence of responses was found. Under the INDIVIDUAL-GROUP sequence without the discussion opportunity very marked convergence was found, but it only approached the significance level. It may be pertinent to indicate that the discussion which followed the initial conditions responses consisted of much giving of orientation, of suggestion and of opinion to each other, of some tension over uncertainties of the situation and of some antagonism toward the experimenters (Bales' technique, 1950). Despite the clear impression gained by the experimenters from both observation of the verbal interaction and typescript analysis that the discussion contained ample evidence to the three subjects that no one of them knew any more of the objective facts regarding the ball rolling distances than any other, the convergence effect occurred in the subsequent GROUP conditions responses. Control sets of subjects run under the INDIVIDUAL-INDIVIDUAL sequence with discussion intervening also showed a marked convergence effect under the final INDIVIDUAL conditions. This compares with the

absence of convergence found for subjects run under INDIVIDUAL-INDIVIDUAL sequence without discussion opportunity. For the discussion variable sets of subjects less convergence was found for the final INDIVIDUAL conditions of the INDIVIDUAL-INDIVIDUAL sequence than for the GROUP conditions of the INDIVIDUAL-GROUP sequence.

For the GROUP-INDIVIDUAL sequence with discussion intervening a slight convergence was found for the final INDIVIDUAL conditions. This compares with the rather sizable divergence found under the final INDIVIDUAL conditions of the GROUP-INDIVIDUAL sequence without discussion.

Subjects run under the GROUP-GROUP sequence with discussion interval showed further convergence under the final GROUP conditions. This compares with the GROUP-GROUP sequence with no intervening discussion where some divergence was found under the final GROUP conditions.

DISCUSSION

Kantor has indicated that cultural or shared responses constitute by far the major portion of the individual's reactional equipment. Interpersonal contexts generally constitute the loci for the development of such responses. Perhaps the typical situation is the child (with little or no appropriate response equipment) evolving common stimulus-response functions within the contexts of others who have already established responses. The child comes to respond with common perceptions and consummatory response functions to objects and events about him. The arbitrariness of many of these response functions need not be belabored. The adult moving into a new culture or group within the culture "adapts" by interacting with objects and events in ways common to members of the group, although his broader response equipment may make clearer to him the arbitrary character of the responses.

The study reported here makes use of a somewhat different culturalization situation. None of the subjects had established appropriate response equipment prior to the experimental situation. In a sense it may be said that behavior history factors were controlled for the responses required by the very novelty of the judging situation. Only generalized and non-specific reactional equipment for the judging task could be utilized. Perceptual frames of reference had to be established by each subject within the experimental situation.

Under the experimental circumstances the subject responding initially under INDIVIDUAL conditions establishes his particular frame of reference for perceiving stimulus distances and responds rather consistently within it. Subjects typically reported the practice of responding to a short duration of rolling noise with a short distance judgment and to longer rolling noise durations with longer judgments. A number of subjects reported doing this by imagining the size of the ball. (Imagined sizes of the ball apparently ranged from the size of a b-b to that of a bowling ball.) Precise distance functions varied greatly under these circumstances.

The availability to the subject of other subjects' responses under the GROUP conditions added a significant variable. There is no doubt

that each subject made use of these responses in developing his perceptual frame of reference. The effect was to promote shared stimulus-response functions for subjects who had these responses available in making judgments. Evidence seems clear that these common perceptual frames of reference tend to be maintained by the individual subjects under subsequent INDIVIDUAL conditions. The strength with which these are maintained, however, varies with the setting conditions in which responses are made.

The variable of conversational interaction between the initial and final conditions apparently operates to further the sharedness of responses. That this would occur when the discussions revealed different frames of reference held by the subjects and lack of consensus regarding the facts of the stimulus situation is of considerable interest. One might expect that once the subject had discovered that no other subject knows any more than he knows that he would continue to maintain his idiosyncratic frame of reference. The culturalization group effect upon the perceptions of the individual appears to operate with great strength.

A further study in the effect of the amount of prior knowledge held by the subject in this interactional situation is in process.

STUDIES ON PAIN AND ANALGESIA

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With a view toward improved understanding of the modes of action of potent analgesic drugs, the present paper will deal with "pain" and its relief by chemical agents. The interpretations are based chiefly on studies completed here as one aspect of a cooperative program of the experimental neuropsychiatric and psychological sections of the NIMH Addiction Research Center.¹

Observation and common knowledge seem to indicate that structure-function principles can easily bear the explanatory burden for the stereotypy of responses of many species to noxious stimuli: that of the scratch reflex of the pithed frog to an irritating chemical, for instance, or of the flexor reflexes of the spinal dog to sharp pressure on the toe. On a more complex level, ecological reactions are prominent: a man withdraws his finger when it is injured; even Stentor finally changes its attachment when conditions become sufficiently irritating.

Organism-object relationships which result in avoiding injury or harm appear to mark the point at which behavioral history enters ontogenetic development as a partial determinant of action. The evolution of correlated response and stimulus functions provides the organism with possibilities of dealing with harmful objects before direct contact with them is made. This class of situations is not usually considered one that involves pain, although it may be productive of anxiety.

The situation that man reports as painful is one in which injury or harm is not usually avoided. Under these conditions, reflexes and other physiological reactions follow the stimulation, and probably these are overlaid and modified by affective responses such as fear and anxiety, which occur as response-stimulus functions evolve.

Clinical pain is quite inaccessible to psychological investigation. Frequently the patient cannot indicate the stimulus except by pointing to a general body area. The response is even more obscure. The patient can only report that he has pain or discomfort. (The introspection of a psychologist can improve little on such report.) Nevertheless, the clinic seems to provide the appropriate conditions for testing analgesic drugs after a certain degree of potency and safety has been established by experimental screening procedures. Fairly successful attempts in this direction have been made by Beecher (1) and Houde (10), in which large numbers of postoperative and

1. The experiments are described in logical rather than chronological order.

cancer patients verbally reported the decrease in pain following administration of drugs. These hospital procedures, however, have several limitations: of necessity, they cannot be used for screening drugs; they may be subject to gross errors of measurement, e. g., postoperative confusion may produce an inability of the patient to estimate accurately the intensity or degree of pain; and they are inappropriate for altering independent variables in the search for causal relationships. The research worker, then, in attempting to analyze the actions of analgesics, must design procedures that are in some respects similar to clinical pain, remembering, of course, that the final criterion of analgesic action of a drug is the effect it produces on the behavior of a patient who reports pain.

Most of the laboratory methods in current use for testing the analgesic potency of drugs are physiological in character. The "tail-flick" method using rats is fairly reliable for rough screening of drugs, but it and similar techniques mainly elucidate physiological mechanisms of drug actions. However, even though there is no laboratory technique that is quite analogous to pain as it occurs naturally, experimental investigations can use techniques that permit the drawing of inferences concerning drug effects on attention, perception, and affective consummatory responses (11).

The Wolff-Hardy-Goodell technique is probably the most widely known of the few psychological methods that have been employed in assaying analgesics (14). It uses changes in the pain threshold for radiant heat as the pertinent measurement. Although ability to perceive minimal pain stimuli does not seem to be consistently altered by known analgesics, except when used by the originators, observations of these workers were quite revealing. They reported that the alteration in reaction to painful stimuli under morphine seemed to be of more importance than induced changes in perception; the subjects responded to the stimulus but it no longer disturbed them. On reinterpretation, these statements would seem to indicate that simple discrimination of painful stimuli is not altered by therapeutic doses of morphine. More important, it would seem to indicate that one of the analgesic actions of this drug is an alteration in affect. These interpretations are also in accord with the findings of Wikler, Goodell, and Wolff (13) that therapeutic doses of morphine (15 mg.) did not alter absolute thresholds in other sensory modalities.

In considering this and other work it seemed appropriate to study systematically the effect of morphine on man's ability to estimate the intensities of painful stimuli. If opiates impaired simple discrimination, much of their analgesic action might be explained. This seemed an unlikely result, however, in view of the earlier work, but the question required a definite answer.

The painful stimulus used was electric shock, for it acts instantaneously and can be varied easily. Preliminary work showed that large discrepancies in estimates of intensity occurred when different variables were controlled singly. A study, therefore, was carried out in which it was discovered that verbal report of changes in intensity corresponded more closely to delivered wattage (power) than to delivered voltage or amperage (7). With this question answered, the next

problem was to test the effect of morphine on estimates of such intensities.

The effects of subcutaneous injection of 15 mg. of morphine on the ability of postaddict subjects to judge the intensity of painful electric shock stimuli were studied under two conditions: (a) under formal conditions, proceeding with the experiment without familiarizing the subjects with the potentially fear-inspiring experimental situation; (b) under informal conditions, preceding the experiment with reassurance, demonstration, and explanation designed to allay the subjects' anxiety. Independent groups composed of randomly assigned subjects were tested under control, placebo, and morphine conditions in each of the indicated major treatments. All subjects were given a practice period, before injections, in which a series of nine different intensities were reported by the subjects as being "stronger" or "weaker" than a standard stimulus of 1.65 watts. Morphine or the placebo was then injected as indicated for each subject. Fifty minutes later, testing was resumed. Six consecutive series of shock stimuli were then delivered and the subjects reported whether each stimulus was "stronger" or "weaker" than the previously given standard (8).

Under formal conditions, a significantly greater number of stimuli were judged "stronger" than were actually delivered. These errors were reduced significantly by morphine, but were not altered by placebos. Under informal conditions, reported judgments were extremely accurate and neither morphine nor placebos had any significant effect on estimation of the intensities of painful stimuli.

Results of the investigation showed that, although some slight increase in variability of estimation occurred on morphine conditions, simple perception or discrimination of painful stimuli was not altered by this drug. Nevertheless, the effect of morphine under formal conditions gave support to the hypothesis that the drug acts primarily by reducing affective consummatory responses.

At the present stage of knowledge it seems impossible to test the above hypothesis directly. Many physiological and neurophysiological changes have been demonstrated after injection of opiates. The dangers of extrapolation to behavior, however, are emphasized by Stephen and Gantt's study (12), in which it was found that morphine impaired a conditioned "skeletal" response more than a conditioned "autonomic" response. Thus, it would be hazardous to hypothesize as to how particular drug-induced physiological changes participate in the relief of pain. Surmises can be made, though, as to how alteration in the response setting might limit affective behavior (anxiety).

Our approach, therefore, to the influence of opiates on affective behavior was indirect. Anxiety was used as a construct but inferences concerning it were drawn mainly from alterations in a simple overt response which were associated with electric shock penalty. Clinical observations and subjects' reports were used as adjunctive material.

Former addicts, who were serving sentences for violation of the Harrison Narcotic Act, served as subjects. In this study six series, each composed of 18 manual reaction times to visual stimuli, were ob-

tained on each subject (9). Reaction times of days without morphine were compared with those after subcutaneous injections of 15 mg. of morphine sulphate under the following conditions: (a) the subjects were motivated only by a general knowledge of their performance, and (b) the subjects were penalized by a self-administered brief, but strong, electric shock to one hand immediately after each response which was slower than the shortest previous median value.

Space permits only a brief description of the procedure; nevertheless, it is important to note that several factors which have been found to contribute to "experimental neurosis" were incorporated in this study: (1) the subject was constrained to produce a specific response; (2) the demanded response might or might not be severely punished; (3) the subject was forced to penalize himself; (4) the response was penalized immediately upon its completion; (5) the periods between stimulation, and between the warning and stimulus lights, provided an opportunity for disturbing anticipatory responses, since the subjects could not know whether the shock-light or nonshock-light would appear. The subjects maintained that it was not so much the shock that disturbed them, although it was severe, as it was the expectancy and uncertainty of the stimulation.

This repeated penalization for slow reaction times produced a striking disruption of performance, manifested by a marked increase in the latency of responses. Following administration of morphine such disruption was greatly reduced. Morphine prevented a significant detrimental effect of shock penalties upon reaction time. Indeed, in some subjects, reaction times under these conditions were shorter than those obtained under control conditions.

The studies to this point showed that the analgesic action of morphine is not produced by impairment of simple perception or through impairment of reaction systems involved in quickly pressing a key. However, the demonstration that morphine reduces the disruption of performance that accompanies repeated painful shock penalties indicated that morphine acts in a powerful manner in reducing affective consummatory responses. It was, therefore, hypothesized that a necessary, if not sufficient, condition for the occurrence of analgesia is reduction or elimination of anxiety that is associated with painful stimulation.

This hypothesis was further tested by using in the reaction time procedure a barbiturate for which only a small degree of analgesic potency was claimed. Also, as it seemed advisable to verify the earlier results on morphine, independent groups were employed in six different conditions: parallel studies were carried out under "shock" and "no-shock" conditions for control, morphine (15 mg.) and pentobarbital (250 mg.), using a much refined technique (5). The greater uniformity of results attested to improvement in the procedure. The striking disruption in control reaction time performance was as evident as in the previous study but was more constant from subject to subject. Morphine prevented or eliminated such disorganization, and pentobarbital had no effect upon it. In fact, reaction times were longer, but not significantly so, under shock-pentobarbital than under shock-control conditions.

These studies were encouraging. They provided considerable support to the hypothesis that anxiety reduction is a necessary condition for the occurrence of analgesia, and threw some light, albeit weak, on opiate addiction. The procedure, however, was very severe and approached the production of short term experimental neurosis in man. Thus, although it held considerable promise as an analgesic testing method, it was impractical for general use.

Clinical observations made during these experiments provided further evidence that opiates produce part of their effects by altering affect. An observer reporting on the behavior of postaddict patients who have received morphine, would infer from their actions that a highly desirable condition had been achieved. The subjects themselves report that the experience is the combined essence of everything that has been pleasant to them. They report a very powerful "as if" reaction in which most that is undesirable is eliminated and most that is desirable is realized.

The situation appears similar in character, though opposite in effect, to that of Cantril's study on "cold emotion" (3). After injection of adrenalin, his patients reported forebodings and premonitions of being fearful and of having anxiety (an "as if" reaction). In this case the organismic changes were not the result of the operation of previously developed response-stimulus functions. Although the case of the postaddicts' reaction is not exactly comparable, since the condition produced by morphine has been endowed with powerful stimulus functions, the "as if" reaction still seems very apparent.

The generalization is not made or implied that analgesia occurs after administration of morphine through the production of euphoria. That euphoria occurs in postaddicts upon injection and in some post-operative cases upon relief of pain probably would not be questioned. However, the above illustrations are given in support of the hypothesis that physiology or response settings are so changed by morphine as to preclude the occurrence of affective response (anxiety), unless the situation is very extreme. Morphine may or may not enhance readiness to respond in other ways, depending upon the class of response, individual history, and stimulus and response setting factors. But, it appears to induce analgesia, in part at least, through organismic changes which reduce readiness to respond affectively to noxious or fearful stimuli.

As indicated, the experimental procedures for studying anxiety associated with the anticipation of pain and the effect of drugs thereon proved impractical for general use with man. Consequently, a behavioral analgesic testing method using the white rat has been developed (4). It is hoped that studies in progress will further elucidate modes of drug actions. In human studies, investigation of the influence of drugs has been extended from the work on pain to other incentives, and explanatory principles have been formulated, partly, in terms of altered motivations (6). Some slight progress has also been made on investigation of personality characteristics of postaddicts (2). Plans for the future include work to bring these two lines of endeavor together. This will be an attempt to demonstrate correlations between particular personalities and the effects of preferred drugs on

certain motivations.

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AN INTERBEHAVIORAL ANALYSIS OF SENSORY PRECONDITIONING

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Behavioristic psychologists generally accept the necessity, if not the sufficiency, of spatial and temporal contiguity of "stimulus" and "response" for conditioning to occur. For this reason the data of sensory preconditioning experiments have posed a serious problem for behaviorists. This paper will examine one solution to this problem proposed by S-R theorists and present an analysis based on principles of interbehavioral psychology.

An S-R analysis of the sensory preconditioning experiment generally results in the identification of three stages. Stage one involves merely the paired presentation of two stimuli to the subject. In stage two some response is conditioned to one of the pair of stimuli. Stage three, the test, involves presentation of the non-conditioned stimulus and a count of the number of "conditioned" responses. Stage one is carried out in a situation different from that of stages two and three. Experiments on humans and infrahumans reveal rather consistently that subjects so treated perform more "conditioned" responses than do control subjects not given stage one.

Experimental findings of this type have been presented as evidence of the notion that S-R contiguity is not necessary for learning, or, more generally, that experience is something apart from responding to stimulation. Proponents of this view account for the data in terms of the mere "association" of the two stimuli in phase one.

One attempt by S-R theorists (2) to include the data of sensory preconditioning within the S-R framework centers around the concept of "response mediated generalization." In general, the idea is that some response (or responses) made during presentation of the preconditioning stimuli in stage one is conditioned to the stimulation. If the stimuli are presented simultaneously, the same response (or responses) should be conditioned to both of the stimuli. Transfer which is found to occur under test conditions is then assumed to be due to generalization mediated by the common response learned to the two stimuli. Thus response is brought into the picture to replace a mere association of stimuli.

An indirect test of this notion was made by Silver and Meyer (1). The presentation of preconditioning stimuli was changed in some conditions from the simultaneity required in the interpretation above. The experimental design involved three basic conditions, as follows:

- (a) Simultaneity of presentation of preconditioning stimuli so that the stimulus-response linkage would be simultaneous.
- (b) Presentation of the preconditioning stimuli at different points in time with the response of stage two conditioned to the second of the pair. Thus, under test conditions, the linkage would be by backward conditioning.
- (c) The same presentation of preconditioning stimuli as in (b) but

with conditioning in stage two to the first stimulus of the pair. Thus, under test conditions, linkage would be by forward conditioning.

These investigators found that the forward conditioning group performed more transfer responses under test conditions than did either of the other two groups. Since this state of affairs is commonly found in straight conditioning experiments, the investigators argue that the results constitute evidence for response mediated generalization.

This sort of argument, plus the fact that the behavior segment of stage one is not reported, suggests that response mediation is considered by these investigators as an intervening variable. At any rate, there seems to be at best a rather tortured continuity of event and theory and the logic of the argument is weak. The fact that some characteristics of conditioning are also found in the sensory preconditioning does not demonstrate the presence of conditioning in the latter situation.

Still, the fact that different temporal arrangements of preconditioning stimuli and testing conditions lead to predictable differences in behavior remains, and seems worthy of our attention.

An interbehavioral analysis of the events of preconditioning situations would suggest that the importance of the first stage lies in the development of stimulus and response functions. With other conditions specified, there is also the obvious suggestion of the importance of the behavior segment occurring during this time.

With this basis the writer developed the line of reasoning that sensory preconditioning would depend upon the involvement of similar stimulus and response functions in the three stages of the experiment. Within this general framework, it was reasoned further that the development of functions would be promoted more by consistent interbehavior with the stimulus objects than by varied interbehaviors. Thus, subjects showing such consistent interbehavior should also show more responses under test conditions.

An experimental test of this hypothesis (using rats as subjects) was conducted. The preconditioning stimulus objects were a 40 watt light and a partially muted 6 volt buzzer. There were 360 paired presentations of the preconditioning stimulus objects. The experimental group was run on a treadmill during stage one in order to insure a fairly consistent interbehavior. One control group was run on the treadmill first and then placed in a small cage (in the not-operating treadmill) during presentation of the preconditioning stimulus objects. A second control group was not required to run at all. The behavior of the control groups in stage one was quite variable.

In order to maximize the possibility of transfer, the running response was also selected for the conditioning and test stages. Conditioning was accomplished by administration of a mild electric shock to the feet of the subjects if they did not run within a short time interval following stimulation. A criterion of conditioning of seven C. R.'s in ten trials was used. Animals not reaching criterion in 140 trials were eliminated.

In the test situation, consisting of 70 trials, the experimental group performed a significantly greater root number of running responses than did either of the control groups.¹ This finding is in line with the prediction based upon the interbehavioral analysis and lends at least partial support to the analysis. Further investigation is suggested in which stimulus and response functions developed in stage one are different from those developed in the latter two stages.

Two advantages of an interbehavioral analysis of sensory preconditioning are suggested. The first and possibly more obvious of these is the direction of the researcher's attention to an important segment of the event under study: the interbehavior of the organism and the preconditioning stimulus objects.

The second advantage is that this analysis enables description which is continuous with the event. This type of description appears to the writer to be much more desirable than the appeals to indirect evidence and intervening variables which are so prevalent in contemporary psychological theory.

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1. Since the raw data did not satisfy the requirement of homogeneity of variance, a square root transformation was performed. A Bartlett test showed the transformed data to be homogeneous.
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REFERENCES

1. Silver, G. A., & Meyer, D. R. Temporal factors in sensory pre-conditioning. J. comp. physiol. Psychol., 1954, 47, 57-59.
2. Wickens, D. D., & Briggs, C. E. Mediated stimulus generalization as a factor in sensory pre-conditioning. J. exp. Psychol., 1951, 42, 197-200.

NEWS AND NOTES

Readers are invited, in fact, are urged, to contribute comments on articles published in the Psychological Record. In this connection Dave Herman writes: "I think a sorely needed service can be performed by the Record if readers are urged to offer comment on both the possibilities and limitations of work done...and it won't do to have a mutual back-scratching admiration society."

Since the next issue is scheduled for July 10th please submit your comments by June 1st.

NEWS

John F. Brackmann, Jr. has been appointed assistant professor of psychology at Sacramento State College, beginning September 1956.

Paul Swartz will join the Department of Psychology of the University of Wichita in September 1956. The Wichita address should be used for communications to him beginning June 10th.

NOTES

Stanley Ratner's article, "Three Questions About Experimental Extinction," published in the last issue of the Record, stimulated much discussion among three interbehavioralists at the University of Wichita: N. H. Pronko, Grant Kenyon, and Dave Herman. In fact, the Wichita group has scheduled a meeting to exchange viewpoints concerning the construct of behavior segment. Notes are to be taken and submitted for publication in an early number of the Record. This is most heartening, since Dr. Ratner writes that the questions he raised in his paper "were not meant to be rhetorical." He specifically requests that someone undertake to answer them.